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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/763,199	04/25/2001	Winfried Maier	225/49630	3649

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EXAMINER

LE, DAVID D

ART UNIT	PAPER NUMBER
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3681

DATE MAILED: 05/18/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/763,199

Applicant(s)

MAIER, WINFRIED

Examiner

David D. Le

Art Unit

3681

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 01 April 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 12-48 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 12-48 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 April 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

### DETAILED ACTION

This is the fourth Office action on the merits of Application No. 09/763,199, filed on 25 April 2001. Claims 12-48 are pending.

#### Documents

1. The following documents have been received and filed as part of the patent application:
  - Declaration and Power of Attorney, received on 04/25/01
  - Information Disclosure Statement, received on 04/25/01
  - Priority Document, received on 04/25/01

#### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. **Claims 12-14, 18-23, 30-36, and 40-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over U. S. Patent No. 5,560,461 to Loeffler in view of U. S. Patent No. 4,531,984 to Madsac et al.**

Claims 12-14, 18-23, 30-36, and 40-48:

**Loeffler** (i.e., Figs. 1-2, column 3, line 46 – column 5, line 59) discloses a multiple cone synchronizer for use in facilitating gear shifting in vehicle transmission comprising:

- An outer synchronizer ring (60);
- An center synchronizer ring (70);
- An inner synchronizer ring (80); and
- A plurality of friction surfaces (77, 78, 86);
- Wherein each of the synchronizer rings (60, 70, 80) has conical surfaces and they are connected at least indirectly to one another;

Loeffler lacks:

- At least one of the synchronizer rings (60, 70, 80) including a metallic basic material;
- Wherein at least one of the synchronizer rings (60, 70, 80) includes the metallic basic material which is nitride-hardened in such a way that, by process parameters being set during nitride-hardening, one of a non-metallic  $\gamma'$ -connecting layer and a non-metallic  $\epsilon$ -connecting layer is formed on a conical surface of at least one of the synchronizer rings (60, 70, 80);
- Wherein the  $\gamma'$ -connecting layer is formed which includes  $\text{Fe}_4\text{N}$ ;
- Wherein the  $\epsilon$ -connecting layer is formed which includes  $\text{Fe}_2\text{N}$  or  $\text{Fe}_3\text{N}$ ;

- Wherein a nitriding depth is 200 to 800  $\mu\text{m}$ ;
- Wherein the  $\gamma'$ -connecting layer and the  $\epsilon$ -connecting layer are 1 to 20  $\mu\text{m}$  thick;
- Wherein the  $\gamma'$ -connecting layer and the  $\epsilon$ -connecting layer are 10  $\mu\text{m}$ ;
- Wherein the non-metallic  $\epsilon$ -connecting layer of  $\text{Fe}_2\text{N}$  or  $\text{Fe}_3\text{N}$  is formed on said friction surfaces;
- Wherein the non-metallic  $\gamma'$ -connecting layer of  $\text{Fe}_4\text{N}$  is formed on said friction surfaces;
- Wherein the metallic basic material of at least one of the synchronizer rings is a hardenable steel;

*Madsac* (i.e., column 1, line 10 – column 4, line 40) discloses a surface hardening process for metal parts by nitriding comprising:

- An  $\epsilon$ -connecting layer of  $\text{Fe}_2\text{N}$  or  $\text{Fe}_3\text{N}$  (i.e., column 2, lines 60-68);
- An  $\gamma'$ -connecting layer of  $\text{Fe}_4\text{N}$  (i.e., column 2, lines 60-68);
- Nitriding layer thickness ranging from 250  $\mu\text{m}$  to 500  $\mu\text{m}$  (i.e., column 4, lines 2-40);
- Wherein the  $\epsilon$ -connecting layer and  $\gamma'$ -connecting layer thickness are ranging from 10  $\mu\text{m}$  to 35  $\mu\text{m}$  (i.e., column 4, lines 2-40);
- Wherein the metal part is made of hardenable steel (i.e., column 4, lines 1-6).

It would have been obvious to one of ordinary skill in the art at the time this invention was made to modify Loeffler inner and outer synchronizer rings' friction surfaces to include the  $\epsilon$  and the  $\gamma'$ -connecting layers such that the nitriding layer thickness would range from 250  $\mu\text{m}$  to 500  $\mu\text{m}$  and the  $\epsilon$ -connecting layer and  $\gamma'$ -connecting layer thickness would range from 10  $\mu\text{m}$  to 35  $\mu\text{m}$  and Loeffler synchronizer rings to be made out of hardenable steel, in view of Madsac, in order to improve the overall fatigue and seizure characteristics of the synchronizer rings as well as to specifically increase the resistance to wear and corrosion of the friction surfaces of the synchronizer rings.

4. **Claims 15-17, 24-29, and 37-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Loeffler in view of Madsac et al. as applied to claims 12-14, 19-23, 32-36, and 41-48 above, and further in view of U. S. Patent No. 6,105,374 to Kamody and U. S. Patent No. 4,618,049 to Pflaum et al.**

Claims 15-17, 24-29, and 37-39:

***Loeffler in view of Madsac*** discloses all elements and limitations as set forth in claims 19-23, 32-36, and 41-48. Regarding claims 15-18, 24-31, and 37-40, Loeffler lacks:

- Wherein at least one of the synchronizer rings is plasma-nitride-hardened;
- Wherein the metallic basic material of at least one of the synchronizer rings is a sintered material;

- Wherein the metallic basic material of at least one of the synchronizer rings is a sinter-forged material;

*Pflaum* (i.e., column 4, lines 5-36) discloses a synchronizer ring being made out of materials including sintered steel and sinter-forged material.

*Kamody* (i.e., column 1, line 60 – column 2, line 29) discloses a process of nitriding metal-containing materials comprising:

- Steel nitriding process;
- Hardenable steel nitriding process; and
- Plasma nitriding process;

It would have been obvious to one of ordinary skill in the art at the time the invention was made to further modify Loeffler synchronizer rings such that the synchronizer rings would be made out of either hardenable steel or plasma or sintered steel or sinter-forged steel, as appropriate, in view of Pflaum and Kamody in order to further improve the overall fatigue and seizure characteristics of the synchronizer rings as well as to specifically increase the resistance to wear and corrosion of the friction surfaces of the synchronizer rings.

***Response to Arguments***

5. Applicant's arguments filed on 01 April 2004 have been fully considered but they are not persuasive.

*Specifically claims 12-14, 18-23, 30-36, and 40-48:*

***First***, applicant argues "Examiner had failed to indicate where in the prior art exist the suggestions to combine the teachings of Loeffler and Madsac."

The motivations to modify the teaching of Loeffler in view of the teaching of Madsac, in order to improve the overall fatigue and seizure characteristics of the synchronizer rings and to increase the resistance to wear and corrosion, are taught in Madsac (i.e., column 1, lines 11-15).

***Second***, applicant argues that "when one of the friction surfaces is a soft friction material (77, 78) and the other is a metallic material, as is the case in Loeffler, there is no evidence that applying a  $\gamma'$  or  $\epsilon$  layer on the surface of the metallic material improves fatigue and seizure characteristics or increase resistance to wear and corrosion."

The friction linings (77, 78) are commonly made from sintered metal material and when these friction linings come in contact with other metallic material, as is the case in Loeffler, the problem of wear and corrosion will eventually occur. By applying a  $\gamma'$  or  $\epsilon$  layer on the surface of the metallic material, as set forth above, the process is believed to increase resistance to wear and corrosion.

Accordingly, the rejections, as set forth above, are still deemed proper.



*Conclusion*

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Kawamura et al. (U. S. Patent No. 5,249,661) teaches a synchronizer ring, wherein the friction lining is composed of a sintered powder material including metal powder component of 80% (see column 1, lines 58-60).

7. This is a request for continued examination (R.C.E.). All claims are drawn to the same invention. Accordingly, **THIS ACTION IS MADE FINAL** even though it is a first action in this case. See MPEP § 706.07(b). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no, however, event will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.


Art Unit: 3681

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David D. Le whose telephone number is 703-305-3690. The examiner can normally be reached on Mon-Fri (0700-1530).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Charles A Marmor can be reached on 703-308-0830. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1113.

  
ddl

  
CHARLES A. MARMOR  
SUPERVISORY PATENT EXAMINER  
ART UNIT 3681